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AN

APPENDIX

TO THE

OBSERVATIONS

UPON

Mr. POTT's GENERAL REMARKS ON FRACTURES.

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PREFACE.

THE very great eaſe, with which we reduced the diſlocated hip, mentioned in the following Appendix, induced me to re-examine the nature of this injury; and the reſult of my enquiry is now offered to the conſideration of the gentlemen of the faculty, as ſeveral circumſtances of conſequence ſeem to have eſcaped the notice of thoſe, who have written on this ſubject. Even our lateſt writers have not in this caſe extended their improvements beyond preſerving the muſcles in a ſtate of non-reſiſtance; and yet, whoever examines into this matter, by proper experiments, will ſee whether this is the chief point we ought to have in view in the cure of the injury immediately under conſideration; whether the bone, being readily replaced, does not often depend upon another cauſe; and whether *wholly* attending to the beſt means of making a conſiderable extenſion, may not frequently lead us from the principal object to which we ſhould pay attention, and from the true intentions of cure, where conſiderable extenſion prevents reduction. In the following caſe all poſſible advantage was at firſt taken of a relaxed ſtate of the muſcles, but making the extenſion as *commonly practiſed, and as adviſed by moſt writers,* probably prevented ſucceſs.

But no true idea can be formed about this matter, unleſs recourſe be had to experiment upon recent ſubjects, and the ſkeleton, from whence a true judgment may be derived concerning the method pointed out, as ſeemingly the moſt adviſeable to be purſued, when called to relieve this accident.—But time, and the experience of many ſurgeons alone, can finally determine whether the practice recommended is right, becauſe this accident ſo very rarely happens. And, indeed, practice is always beſt eſtabliſhed by the concurring teſtimony of different men, if, inſtead of implicitly copying from other writers, they give us their own experience and obſervations.—It therefore affords me infinite pleaſure to find, that what I have ſaid concerning the cure of compound fractures has met with the approbation of ſeveral eminent ſurgeons; and I have been informed by three gentlemen of great experience and undoubted veracity, who have ſeen much of this buſineſs in the courſe of many years practice, that they never loſt a patient on account of a compound fracture, nor ever amputated on this occaſion; which I know nearly correſponds with the ſucceſs of ſeveral other ſurgeons.—I am certain, within the laſt fifteen or ſixteen years, I have talked with more than fifty ſurgeons of experience about this matter; and though it be true that *almoſt all die* of bad compound fractures, in large and crowded hoſpitals, when amputation is not performed, yet it is equally certain, that in the country, when the hoſpital mode of practice is not followed, they *almoſt all recover*, under the ſame predicament, without amputation; from which difference of ſucceſs, obvious and uſeful concluſions may be drawn, without entering more minutely into the matter. And we ſhall only obſerve, that accidents of this kind moſt commonly happen to people employed in hard labour, who in London are generally ſent to an hoſpital; but in the country (where there is not an hoſpital) they are all private patients, which gives the country ſurgeons more frequent opportunities of ſeeing the event of theſe caſes in a pure air, and *under a different method of proceeding*, than falls to the ſhare of thoſe gentlemen, who are ſituated where buſineſs of this kind is for the moſt part, carried on in a place ſet apart for the purpoſe. Surely then, the united obſervations of many country ſurgeons, uninfluenced in their practice by general bad ſucceſs in theſe accidents, is worthy of notice; eſpecially as ſpeedy amputation has been adviſed in every bad compound fracture without limitation. And do not thoſe then, who throw cold water upon well-intended information from this quarter, without making proper enquiry, ſeem deſirous of having it believed, that they had rather ſee all his Majeſty's ſubjects hopping about upon one leg, than that their own opinion ſhould in any inſtance be thought to be erroneous?

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APPENDIX, &c.

SINCE my Obſervations upon Mr. Pott's General Remarks on Fractures were publiſhed, I have had a patient with a diſlocated thigh, from which, I think, I have more ſatisfactorily learned the nature of this accident than from all I have ever read upon the ſubject; and I am deſirous of adding this caſe as a ſupplement to my letter on diſlocations, in hopes that it will put an end to the general uſe of violent extenſion, which has commonly been practiſed and recommended indiſcriminately, as a dernier reſort on this occaſion.

A pauper, fifty years of age, of the pariſh of Aſhfordby, in Leiceſterſhire, was thrown from a waggon-load of coals, and part of the coals falling upon his hip, diſlocated his right thigh-bone, the head of it paſſing inward towards the foramen ovale of the *os pubis.*

Mr. PEAK, a ſenſible ſurgeon of Melton-Mowbray, was called in to his aſſiſtance, who at once diſcovered the nature of the accident; but the part being ſwelled, he bled the patient, applied the uſual remedies to abate the ſwelling, and then, after putting the muſcles in a relaxed ſtate, with *a force commonly uſed* on this occaſion, he attempted the reduction, but without ſucceſs; and not having before ſeen a diſlocated thigh, he deſired my aſſiſtance.

Accordingly, I ſaw this man five days after the accident, when the tumor had ſubſided in conſequence of proper applications, which gave me a better opportunity of examining the nature of this injury, than often happens, becauſe the patient was very lean.—The knee ſtraddled very much outward, the muſcles on the inſide of the thigh, which ariſe from the os pubis, were upon the ſtretch, from the head of the bone lying under them; and this thigh was longer by two inches than the other. The great trochanter did not protuberate in its uſual manner, but was upon a level with the outer edge of the acetabulum, and a nick betwixt them might eaſily be felt with the finger, upon moving the thigh.—From all which it was evident, that the end of the diſlocated bone lay upon and acroſs the cavity from whence its head had eſcaped.

After ſecuring the patient upon a bed on his right ſide, and putting the thigh in a right angle with the body (the knee being bent, ſee p. 56.) my ſervant and another man only, extended it by a towel fixed above the knee, upon which we made a lever of the thigh bone in the manner already directed, (ibid.) and then puſhed the ancle outward, upon which the head of the bone ſlipped into its place without noiſe, and with the *utmoſt eaſe.* Whereas, had a greater extenſion been made, in all probability reduction had not taken place; for though in general, reducing diſlocations conſiſts in making a lever of the diſlocated bone, *after* it is brought by extenſion upon a level with the part from whence it has receded, yet, in inward diſlocations of the thigh, there is always an exception to this rule, the head of the bone *being already before its cavity*, in which caſe, much extention is not only unneceſſary, but tends to prevent reduction.

Perhaps the plates prefixed may explain this matter, but if any one acquainted with the ſtructure of the joints before diſſection, will take into his hands the os innominatum and a thigh bone ſeparately, he will ſoon have a tolerable knowledge concerning an inward diſlocation of the thigh, by applying the upper edge of the great trochanter, (*a*) juſt within or upon the outer edge of the acetabulum coxendicis, (*b*) ſo as to make the head of the bone paſs half way over the foramen ovale, (*c*) and he will alſo ſee, (by placing the thigh bone ſo as to make about a right angle with the vertebræ, and then making a lever of it) what a little extenſion muſt of courſe be neceſſary in the reduction. Nay, it may even be doubted, whether any extenſion will in this caſe be required, becauſe making a lever of the bone, raiſes the great trochanter out of the ſocket, and prevents it from catching upon the cartilage, and being any impediment in reſtoring the bone to its proper place.

Again, if the great trochanter is puſhed into the middle of the ſocket, ſo that the head of the bone entirely covers the foramen ovale, it will be evident by withdrawing it half an inch or an inch, that the head of the bone will be quite clear of the brim of the acetabulum; and that this very ſmall extenſion is all that is neceſſary to replace it. Nor can he omit obſerving, when the foot turns inward, and the head of the bone towards the upper part of the os pubis (*d*), or when the foot turns outwards, and the head of the bone down towards the iſchium * (*e*), tha it would be beſt to pull the ancle gentl inward or outward, as either caſe requires ſo as to place the head of the bone, if poſſible, over the foramen ovale, in a lin croſſing the middle of the acetabulun coxendicis (from *b* to *c*) before any preſſur is made with the knee, ſo as to give it a opportunity of paſſing into its place, ove the notch leading into the acetabulum

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* In theſe three caſes, inſtead of a nick, there will b a cavity felt at the outer edge of the acetabulum, as th great trochanter will be about the middle of the ſocket.

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where, from the ligament yielding, it will meet with the leaſt reſiſtance. And even ſuppoſing a rent in the burſal ligament, it will not, I imagine, by embracing the neck of the femur, be any impediment to this poſition taking place, as it is moſt probable, that the head of the bone eſcapes out of the ſocket in this direction, and that it accidentally inclines up or down afterwards.

But my experiments have led me to think, that the head of the bone never paſſes out of its place *through a narrow opening* made by it in the burſal ligament, but that the ligament is commonly torn off from the greateſt part of the neck of the femur, and no ways confines it in recent diſlocations; and when the bone is reduced, I find a great part of the ligament is preſſed by it into the bottom of the ſocket, from whence it is ſoon raiſed again and reſumes its proper place upon moving the limb forward and backward.

I well remember, in endeavouring to diſlocate the thigh in a man I diſſected ſome years ago, the burſal ligament began to tear off at the neck of the femur; but as I could not readily break the round ligament, I finiſhed the diſplacing of the bone with my knife, and looked at that time upon the nature of the laceration as accidental. Since which, (not having frequent opportunities in the country, of diſſecting the human ſubject) I have had recourſe to experiments upon the joints of brutes, in which I find the ſeparation of the burſal ligament, always begins in the ſame manner before the round ligament tears from its inſertion, and when the head of the bone gets at liberty, and ruſhes out of its place, this ſeparation is enlarged by the capſular ligament tearing off from the whole, or from the greateſt part of the circumference of the neck of the bone. —I even tried whether I could force the head of the bone through an opening near the ſize of a ſixpence, made in the burſal ligament without tearing it off at the neck, but without effect, and the laceration in this manner has been ſo conſtantly uniform, that I cannot help thinking but it is always the caſe in complete diſlocations; nor does it appear to me that it can be torn in any other manner: and does not the only inſtance we have upon record of the diſſection of a recent diſlocation, ſeem to confirm this opinion? In that caſe "the capſular ligament was completely "torn off from the whole circumference "of the neck of the humerus *."

Now, I have always thought that **PETIT** and Dr. **HUNTER** were right in their opinion concerning the rupture of the capſular ligament in diſlocations; but till I had made theſe experiments (ſuppoſing a rent through the ligament) I was at a loſs to account for the eaſe, with which a ſhoulder was reduced, after being drawn from under the pectoral muſcle into the axilla; but finding all or the greateſt part of the ligament torn from the neck of the diſlocated bone, it was eaſy to ſee how this came to paſs, and why the rupture of the ligament does not prevent reduction, when timely and properly attempted *. Nor had I leſs pleaſure in diſcovering the manner, in which the lacerated ligament was prevented from interrupting the cure, when forced under the bone into the ſocket; for after removing part of the muſcles, and diſlocating a thigh, I placed the bone in different poſitions, to ſee in which it would moſt eaſily return into its cavity, but in all of them, it preſſed in a great part of the burſal ligament before it; but, upon moving the bone in a rotatory motion, the ligament inſtantly be-

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* Med. Obſ. and Inq. vol. ii.

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* See POTT on Diſlocations, p. 115.

gan to riſe, and in a few turns reſumed its natural ſituation †; and many experiments have ſince convinced me, that this was not accidental, but certain, after which, in all probability, the ligament very readily adheres to the bone again; for, does not the perioſteum readily re-unite to the broken bone in ſimple fractures? and we ſee inflamed membranes ſoon adhere to the part with which they are in contact. Nay, even where a bone has been expoſed to the air, and covered with matter, yet the pericranium (for inſtance) will readily adhere to it; and this adheſion is more likely to take place where the air has not admiſſion, and nature meets with no interruption.—Should not we therefore preſerve the limb in a ſtate of reſt, for ſometime after reduction to forward this coalition?—And may not a neglect, in this particular, from imagining the burſal ligament unhurt, have prevented the re-union of the lacerated parts, and rendered the limb liable to be diſplaced by every ſlight accident?

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† The ſeparation of the ligament at the neck of the bone, and reſuming its former place, is not to be confined to joints which are compoſed of ball and ſocket; but it happens in a ſimilar manner to thoſe which are joined by ginglymus, except (for example) if the lower end of the humerus is puſhed forward upon the radius and ulna, the ligament is moſtly ſeparated from theſe bones.—There are Surgeons who believe, that the burſal ligament is not ſo frequently lacerated in diſlocations, becauſe ſome of them are weak, diſtractile, and conſtantly moiſtened; but I never could diſlocate a joint completely without lacerating the ligament in the manner deſcribed, whether the diſlocation was made gradually, or by the vis percuſſionis; and if their belief is not founded upon obſervation made in diſſecting recent diſlocations, or upon experiments made on dead bodies, it can give no ſatisfaction in an affair which can only be determined by matter of fact.—BOERHAAVE thought and believed that the head of the femur could not be diſlocated by external violence, *becauſe* of the depth of the ſocket and the ſtrength of the ligaments in this articulation, and he induced others to be of the ſame opinion; but undeniable teſtimonies have ſince evinced that their belief was ill-founded: from whence we may infer how little regard ought to be paid to theories of any kind.—It is therefore deſired, that thoſe who have frequent opportunities of diſſecting the human ſubject, will try whether the laceration does not always happen nearly in the ſame manner.

However if my experiment ſhould have deceived me in this matter, and a rupture in the burſal ligament ſhould ever prevent the head of the thigh bone from being placed in the direction I have recommended before reduction, ſhould not the knee be firſt preſſed outwards a little, to raiſe it above the brim of the ſocket, then making a moderate extenſion in the ſame direction, and afterwards a lever of the thigh (ſee p. 56.) will not reduction take place? Whereas, if theſe ſteps are omitted, may not the head of the bone, if it paſſes over, be locked faſt upon the brim of the acetabulum, (*d* or *e*) and either prevent or render reduction very difficult?

But when the diſlocated part lies already upon the notch (as was the caſe of our patient) the knee ſhould not be twiſted any way by moving the ancle, before the head of the bone is puſhed oppoſite the acetabulum; otherwiſe it will be preſſed upon the very part we have given a caution to avoid, and make a greater extenſion neceſſary than is conſiſtent in this operation; for I apprehend it will ſucceed much better if the bone *ſlips cloſe over* the ligament into its place.

But in all theſe *inward diſlocations*, placing the thigh in a right angle with the body, ſeems to me from experiment, and from the eaſe with which our patien was cured, to be a material point; no wholly in taking off the reſiſtant ſtate o the muſcles (becauſe *very little* extenſion is only wanting) but principally in placing the bone in the moſt convenient ſituation for paſſing into the middle of the ſocket whereas, when the extenſion is mad with the thigh in a right line with th body, the head of the bone is not raiſed or ſet at liberty from the brim of th acetabulum, but is drawn ſliding down in contact with the parts upon which it lies without any poſſibility of the extenſion affording the leaſt aſſiſtance, unleſs th head of the femur is ſituated in the groi

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obliquely above its cavity, and then this kind of extenſion gives us an opportunity of puſhing it rudely into its place at the time it is paſſing by the breach in the ſide of the acetabulum.—And what is worſe, this is done by gueſs work, there being no criterion fixed when it is the moſt proper time to make a lever of the bone. Whereas, preſſing the ancle outward, and bringing the thigh in a right angle with the body, places the bone in a proper ſituation previous to reduction, and at once with certainty determines this matter without the torture conſequent on great extenſion.—And if we are to ſuppoſe the burſal ligament embracing the neck of the femur from a rent through it, will not the conſequence of extenſion with the thigh in a right line with the body, be horrible?

But if inſtead of the bone lying towards the groin, it lies *ſtrait acroſs* the foramen ovale, will not great extenſion with the thigh in a right line pull it below its cavity, and fruſtrate the reduction? For though, when in this ſituation, it has been reduced, while this kind of extenſion has been made; yet, if there is any dependence to be had on anatomical enquiries, it appears that the reduction of the bone muſt have taken place upon making a lever of the thigh, before the extenſion had done much miſchief, (owing probably to the reſiſtent ſtate of the muſcles) for it will be evident to every one who makes the experiment, that when the head of the femur lies in the ſuppoſed poſition, the making a lever of the thigh bone is more likely to reduce it *without any*, than *with much* extenſion.—Nay, even when the thigh makes a right angle with the body, great extenſion will keep the head of the bone at a diſtance from the part, into which it ſhould enter, and when it ceaſes, it is ten to one but the patient will be in ſtatu quo: and upon a fair enquiry into this matter, I am apt to think it will be found, that all the difficulties which have ariſen in reducing inward diſlocations of the thigh, have been owing to violent extenſion with the limb in a wrong poſition *.

If the head of the thigh bone is placed upon, or near the brim of the outer edge of the acetabulum, I apprehend we ſhall have a clear idea of an *outward* diſlocation of the hip, which ſometimes happens; how it came to paſs that the reduction was ſo eaſily accompliſhed in the caſes I have mentioned, by only moving the thigh, and preſſing with my hand againſt the trochanter, (ſee p. 53 and 54.) and that the ſame eaſe muſt always attend this kind of luxation.—But when the head of the bone is diſlocated beyond the acetabulum under the glutæi muſcles, the general rule of making extenſion ſufficient to bring it upon a level with the brim of its cavity, takes place. Nor, in this caſe, would the thigh making a right angle with the body, be a proper poſition, becauſe when the head of the bone is under the glutæus minimus it is above the part into which it muſt return, and drawing it downward will give a better opportunity of putting it into its place; and accordingly we ſee Mr. WHITE [*] reduced this kind of diſlocation with the *greateſt facility imaginable* by placing the patient upon his back, and making his extenſion with the thigh in a ſtrait direction; but if a relaxed ſtate of the muſcles, and bringing the head of the bone directly acroſs the middle of its cavity ſhould ſeem preferable, I apprehend the patient ſhould be placed on his ſound ſide, and the extenſion made with the thigh forming an obtuſe angle with the body, which is probably the poſition to which the limb will incline after the accident.

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* WISEMAN, who wrote *from practice*, and ſeems to have reduced diſlocations of the thigh with great eaſe, ſays, "There is no need of ſo great extenſion in an inward luxation of the thigh." And in "tough bodies" where (he thinks) the ſtrongeſt extenſion is required, he orders only one man to *pull at the leg*.—Probably, the extenſion he made obliquely towards the ſound leg, with the patient laid upon a table flat on his back, being gentle, did neither good nor harm, but the reduction more likely took place, ſimply from his making a lever of the bone, when (in puſhing the knee up towards the belly) it came into the ſituation we have recommended. See WISEMAN.

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[*] Caſes in Surgery, p. 124.

RECAPITULATION.

From the whole of what has been ſaid, does it not appear, that the injury, of which we have been treating, may eaſily be remedied, when proper ſteps are taken? For reducing an inward diſlocation of the thigh, ſeems to conſiſt only in placing the patient in the manner we placed the pauper, or (which appears to me a more convenient and eligible method for performing the operation) ſitting upright upon the edge of a table, or a bed of a convenient height, on which he muſt be properly ſecured.—This being done, if the head of the bone lies directly acroſs the foramen ovale, (which I apprehend may be known by the inner condyle of the femur being neither elevated nor depreſſed) a gentle extenſion, and making a lever of the bone ſeems to be all that is neceſſary.—But if it does not lie already in this direction, it ſeems right to puſh the ancle outward or inward, ſo as to bring the knee into its natural poſition, or (if this cannot be done) to preſs the knee a little outward before theſe ſteps are taken.—And laſtly, when the great trochanter is felt with its natural protuberance, the ancle may be puſhed outward, to direct the head of the bone into the bottom of the ſocket, if it is not immediately forced in by the action of the muſcles.—In the ſame ſituation too, when the thigh is diſlocated *outward*, but not beyond the brim of its acetabulum, we ſee (p. 56) it may eaſily be reduced, by only moving it, and preſſing upon the great trochanter.—But when the head o the bone is under the glutæus minimus, greater extenſion muſt be made with th thigh in a different direction *, before the great trochanter can be puſhed inward, or the knee outward with advantage; but in each kind of diſlocation it ſeems neceſſary to move the thigh about immediately after reduction, the ſooner to reſtore the ligament to its proper place, and haſten the complete recovery of the patient: and to this we may add, that it is not neceſſary that all the different movements we have recommended ſhould be performed in the ſame inſtant of time, as if we were playing legerdemain, which has been adviſed, but they may regularly ſucceed each other, with conſiderable advantage both to the operator and the patient.

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* See above.

FINIS.